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ZOOLOGY.

The Fauna of the Mississippi Bottoms.—The Illinois State Laboratory of Natural History is engaged in a study of the aquatic animals of the state. A contribution to a knowledge of these is given by Prof. H. Garman in a recent publication from the laboratory.[1] When the region was studied the river was high, and hence many forms were lacking which might have been found at low water. An astonishing feature was the great rarity of Batrachia. There was an interesting commingling of lake and river fishes in the sloughs. Garman thinks some of the Unionidæ act as scavengers. Notes are given on the various forms of vertebrates and invertebrates collected by the survey, but some groups are scarcely touched upon, while forms as prominent as the Crustacea are not mentioned in the Report.

Neomenoidea.—Hansen has had abundant material for the study of these interesting molluscs and recognises[2] three species of Neomenia and six of Proneomenia, *P. filiformis* being new. Hubrecht's definition of the latter genus must be modified, for Hansen finds in two species a well developed penis on either side. The same forms show no well developed filiform branchiæ as in Neomenia, but in the "anal cavity" are well developed epithelial folds which are regarded as functional gills and the anal cavity of Hubrecht is called a branchial cavity. Hansen further describes the various organs in both genera mentioned above and also in Chætoderma. In Proneomenia as in Chætoderma the eggs pass through the pericardium, passing thence by a canal on either side into which the vitellaria empty. The blood in the living animals is red, but it was not settled whether the color belongs to the round or oval nucleated corpuscles or to the serum.

The Classification of the Lamellibranchs.—Dr. W. H. Dall[3] has attacked this perennial problem from the characters afforded by the hinge. In many respects he is in accordance with Neumayr.[4] In short he recognises three types of hinge, although these may intergrade. The most archaic, the lack of teeth in the hinge is made to characterize the order Anomalodesmacea containing the sub-orders Solenomyacea, Anatinacea, Myacea, Eusiphonacea, and Adesmacea. The prionodont type has the hinge with teeth transverse to the long axis of the shell and is characteristic of the order Prionodesmacea with the sub-orders Nuculacea, Arcacea, Naiadacea, Trigonacea, Mytilacea, Pectinacea, Anomiacea, Ostracea. A pure orthodont type of hinge hardly exists. In this the hinge should be longitudinally plicate. Usually however it is combined with the prionodont type. This mixed condition finds exemplification in the order Teleodesmacea embracing the sub-orders Tellinacea, Solenacea, Mactracea, Carditacea, Cardiacea, Chamacea (? Rudistes), Trinacreacea, (?) Leptonacea, Lucinacea, (?) Isocardiacea, Veneracea. A classification of this sort is convenient, but it seems to the present writer no more satisfactory than its predecessors, based as it is on the characters of a single structure. Adequate reasons for the substitution of the Goldfussian name Pelecypoda for the more familiar Lamellibranchiata and Acephala are not apparent, although Dr. Dall is in good company in this respect.

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[1] Preliminary Report on the animals of the waters of the Mississippi Bottoms, near Quincy, Ill., 1889.

[2] Bergens Museums Aarsberetning for 1888 [1889.]

[3] *Am. Jour. Sci. & Arts*, XXXVIII., Dec., 1889.

[4] Stz. k. Akad. Wiss, Wien., Math. Nat., Cl. I., Bd. 88. 1883.

A Remarkable Crustacean.—Dr. G. H. Flower describes[5] under the name *Petrarca bathyactidis*, a parasitic crustacean found in the abyssal anthozoan, *Bathyactis symmetrica*. The animal is nearly spherical, 1.5 to 1.8 mm in diameter, and has much of the general structure of a Lepas without the peduncle. The penis is bent foward under the thorax, the legs are reduced, and the mantle is without calcareous plates. The appendages consist of a pair of preoral antennæ, a pair of weak mandibles lying in an oral cone, and six pairs of postoral (thoracic) appendages which are not biramose. The alimentary canal consists of three median cæcal portions (there being no anus) and the paired hepatopancreas. The nervous system is extremely reduced and is not divided into ganglia. The annual is hermaphroditic. No sense organs were recognised. Petrarca is regarded as closely allied to Laura and Synagoga, and all are placed in the group Ascothoracida. This group is regarded in many respects as intermediate between the Ostracoda and the Cirripedia, Petrarca leaving the main stem later than its associates.

Anatomy of Polyxenus.—Heathcote has studied[6] some points in the structure of this interesting Myriapod. The account of the external genitalia given by Latzel is confirmed. Two Malpighian tubes occur bound to the rectum by a common membrane. The nerve cord is more like that of Chilopods than that of any other Chilognath; the eye has a lens approximating that of Scutigera, the hypodermis cells forming a sort of diaphragm, and the crystalline cone cells being arranged in groups. Heathcote concludes that Polyxenus has preserved traces in its anatomy of descent from the common ancestor of both Chilopods and Chilognaths, "such ancestor being related to the Archipolipoda" [*sic.*] He also regards the Myriapods as having a Peripatus-like rather than a Thysanuran ancestor.

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[5] *Quarterly Jour. Micros-Sci.*, XXX., 1889.

[6] *Quart. Jour. Micros. Sci.*, XXX., 1889.

The Position of the Cæcilians.—Dr. P. Sarasin gives[7] a brief résumé of the work done by himself and his brother upon the development of *Ichthyophis glutinosus*. The embryos pass through stages which are clearly to be regarded as Perennibranchiate, and Derotreme stages, Sarasin fully recognizing the similarity between the embryos of Amphiuma and Ichthyophis first pointed out by Ryder. In short the result is that the Cæcilians are to be regarded not as a distinct Batrachian order, but in reality as apodous Urodeles. Although the development of the Perennibranchiate will show the affinities of the Batrachia better, the Sarasins recognise Ganoid relationships in the fact that the young Cæcilian has a spiral valve, while in the ear a condition of the ductus endolymphaticus is transitory which is permanent in the Ganoids. On the other hand Reptilian affinities are recognised in the large yolked egg, in the great ossification and extensive articulation of the skull, the condition of the brain, the two aortic arches, a Jacobson's organ of the Reptilian type. The Stegocephali are regarded as highly important in the line of phylogeny.

The Dolphins.—Mr. F. W. True has recently reviewed the Dolphins of the world.[8] He has studied not only the collections of the United States but also those of the chief museums of England, Paris, Leyden and Louvain. The result is, that many forms previously regarded as distinct are merged in synonymy, and for the whole world but sixty-two species are recognized, arranged in the genera Sotalia, Steno, Tursiops, Delphinus, Prodelphinus, Tursio, Lagenorhynchus, Sagmatias, Feresa, Cephalorhynchus, Neomeris, Phocæna, Orcella, Grampus, Globiocephalus, Pseudorca, Orca, Delphinapterus, and Monodon. The genus Pontoporia is not regarded as belonging to the family Delphinidæ. The whole work is accompanied by two keys, one based upon external, the other upon cranial characters. The North American species recognized are as follows:—*Sotalia tucuxi* (? Florida),

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[7] *Verhandl. anat. Gesellsch. a. d. 3 Versamml.*, 1889.

[8] Bulletin U. S. Nat. Mus. No. 36. 1889.

Tursiops tursio, *T. gillii*, *Delphinus delphis*, *Prodelphinus euphrosyne*, *P. plagiodon*, *P. longirostris*, *Tursio borealis*, *Lagenorhynchus acutus*, *L. albirostris*, *L. obliquidens*, *L. thicolea*, *Phocæna communis*, *Ph. dallii*, *Grampus griseus*, *Globiocephalus melas*, *G. brachypterus*, *G. scammoni*, *Delphinapterus leucas*, and *Monodon monoceraus*. Probably the above list will be extended, as these forms are largely cosmopolitan in their distribution.

The Relationship of the Genus Dirochelys.—This tortoise was for the first time described by Latreille, from manuscript notes and drawings of Bosc, under the name of *Testudo reticularia*; the year after, Daudin described it as *T. reticulata*. Agassiz established the genus Dirochelys for the tortoise, but he did not give any characters. He placed it in a sub-family of the Emydinidæ under the name of Dirochelyoidæ (Agass., Cont. N. H. U. S., p 441). Boulenger (Cat. Tort., p. 75) considers it a species of Chrysemys, and places it between *Chr. dorsalia* Ag. and *Chr. troostii* Holb.

For a long time I knew only shells of this species. They at once proved the generic distinction from Chrysemys. The neurals were broader than long, a condition never found in Chrysemys; besides, the rib-heads were enormously long, very much like those in Chelydra and *Emys blandingii* Holb.

It was only a short time ago that I could examine the skull of a specimen in the Smithsonian Institution through the kindness of Dr. L. Stejneger and Mr. F. A. Lucas.

The skull resembles very much that of *E. blandingii*. It has the same lower jaw, the same long postorbital part of the head, and the alveolar surface without median ridge. The interorbital space is still narrower, than in *E. blandingii*, forming less than one-half the diameter of the orbit. A comparison between *Emys orbicularis* L., *Emys blandingii* Holb., and *Dirochelys reticularia* Latr., shows that all three belong to different genera, and that Dirochelys is very much nearer to *E. blandingii* than to *E. europæa*.

I give now the generic characters of these three forms.

Emys Dum.

Frontals excluded from orbit; plastron united to carapace by ligament, and more or less distinctly divided in the adult into two lobes between hyo- and hypoplastra; entoplastron intersected by the humero-pectoral suture. Rib-heads short as in Clemmys.

Type, *Emys orbicularia*, L.

Emydoidea, Gray (name only.)

Frontals not excluded from orbit; plastron united to carapace by ligament, and more or less distinctly divided in the adult into two lobes between hyo- and hypoplastra; entoplastron not intersected by the humero-pectoral suture. Rib-heads very long, as in Chelydra.

Type, *Emydoidea blandingii*, Holb. Deirochelys Ag. (name only.)

Dirochelys Ag.

Frontals not excluded from orbit; plastron united to carapace by suture, not divided into movable lobes; entoplastron not intersected by the humero-pectoral suture. Rib-heads very long, as in Chelydra.

Type: *Dirochelys reticularia*, Latr. Clemmys is in the same relation to Emys, as Dirochelys to Emydoidea.

It is clear that Emys has developed from Clemmys and Emydoidea from Dirochelys; the ligamentous connection between plastron and carapace is secondary.—*G. Baur.*

Habitat of Xantusia riversiana Cope.—The locality from whence the specimen came that Prof. E. D. Cope described has not hitherto been recorded; and I now add that information. It was found upon San Nicolas Island, the westward island of the Santa Barbara group California. I have recently received some examples of this lizard from Catalina Island, a larger island of the same group. The lizards contrast in size as do the islands, the larger lizards from the larger island.—J. J. RIVERS, *University of California, April* 24th, *1890.*

Zoological News.—General.—Students who wish to understand the present stage of the study of cell division and its relations to impregnation, heredity, etc., will find an admirable résumé by Waldeyer translated in the *Quarterly Journal of Microscopical Science* for July and December, 1889. It being itself a summary, no abstract can do it justice.

Cœlenterata.—In the Bergens Museums *Aarsberetning* for 1888 [1889], Dr. D. C. Danielssen gives an anatomical description of *Cerianthus borealis,* which he recognizes as destinct from *C. lloydii.*

Fisher[9] states that in Cerianthus the number of tentacles is always odd, the unpaired tentacles being on the ventral side.

Echinoderms.—In a list of invertebrates of the Western fiords of Norway[10] Grieg describes and figures as new *Cucumaria mosterensis.*

[9] Bull. Zool. Soc. France, XIV.

[10] *Bergens Museums Aarsberet.* for 1888 [1889.]

In connection with the recent paper by Fewkes in these pages upon the boring of sea urchins, the reader is refered to an article by G. John[11] in which it is maintained that the teeth form the chief boring apparatus, aided to a slight extent by the spines.

As has long been suspected the saccular diverticula of the starfish are not hepatic, but pancreatic in their function. Griffith and Johnstone[12] have studied them chemically, and find that the secretion is closely similar to that of the vertebrate pancreas.

Vertebrates.—Grieg[13] gives a detailed description of *Lagenorhynchus albirostris*, with a plate, a copy of a photograph.

Dr. Shufeldt gives a review of the work done in the Anatomy of birds during the years 1888–89.[14] The American workers are few, F. A. Lucas and Dr. Shufeldt being the only ones mentioned.

ENTOMOLOGY.[1]

Myrmecophilous Insects.—Herr E. Wassmann continues his interesting investigations on the life of myrmecophilous beetles and their relations to the ants. He distinguishes: (1) true guests which are cared for and fed by the ants (Atemeles, Somechusa, Claviger); (2) forms which are tolerated but are not treated with special friendliness, and which feed on dead ants or rotting vegetable material (Dinarda, Hæterius, Formicoxenus, etc.); (3) ant-eating species, pursued as enemies, or only tolerated as a matter of necessity (Myrmedonia, *Quedius brevis*, etc.), to which may be added parasites like Phora. The three sets are not rigidly separable.

Atemeles and Somechusa have taken on some of the habits of their hosts, and are more adopted than other myrmecophilous insects. The best known species of Atemeles (*A. paradoxus* and *A. marginatus*) are found most frequently in the nests of Myrmica, more rarely in those of Formica and others. On the contrary, *A. pubicollis* seems to be more frequent in Formica nests. The species of Atemeles are lively animals,

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[11] *Archiv für Naturgesch.*, lv.

[12] Proc. Roy. Soc. Edinburgh, XV.

[13] *Bergens Museums Aarsberetning* for 1888 [1889.]

[14] *Jour. Comp. Med. and Veterinary Archives*, 1890.

[1] This department is edited by Clarence M. Weed, Agricultural Experiment Station, Columbus, O.